



## Complete Summary

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### **GUIDELINE TITLE**

ACR Appropriateness Criteria® percutaneous catheter drainage of infected fluid collections.

### **BIBLIOGRAPHIC SOURCE(S)**

Lorenz JM, Funaki BS, Ray CE Jr, Brown DB, Gemery JM, Greene FL, Kinney TB, Kostelic JK, Millward SF, Nemcek AA Jr, Owens CA, Reinhart RD, Rockey DC, Silberzweig JE, Vatakencherry G, Expert Panel on Interventional Radiology. ACR Appropriateness Criteria® percutaneous catheter drainage of infected fluid collections. [online publication]. Reston (VA): American College of Radiology (ACR); 2009. 8 p. [51 references]

### **GUIDELINE STATUS**

This is the current release of the guideline.

The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

## **COMPLETE SUMMARY CONTENT**

SCOPE  
METHODOLOGY - including Rating Scheme and Cost Analysis  
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## **SCOPE**

### **DISEASE/CONDITION(S)**

Infected fluid collections

### **GUIDELINE CATEGORY**

Assessment of Therapeutic Effectiveness  
Management  
Treatment

## **CLINICAL SPECIALTY**

Emergency Medicine  
Gastroenterology  
Infectious Diseases  
Internal Medicine  
Nephrology  
Obstetrics and Gynecology  
Radiology  
Surgery

## **INTENDED USERS**

Health Plans  
Hospitals  
Managed Care Organizations  
Physicians  
Utilization Management

## **GUIDELINE OBJECTIVE(S)**

To evaluate the appropriateness of percutaneous catheter drainage and other interventions for the treatment and management of infected fluid collections

## **TARGET POPULATION**

Patients with infected fluid collections

## **INTERVENTIONS AND PRACTICES CONSIDERED**

1. Percutaneous catheter drainage (PCD), including transvaginal, transgluteal, and transrectal, alone or followed by delayed surgery
2. Needle aspiration (percutaneous, transvaginal, transgluteal, transrectal)
3. Conservative management
4. Drainage (surgical, laparoscopic)
5. Catheter upsizing
6. Intracavitary thrombolytic therapy
7. Antibiotics with drainage or drain removal
8. Splenectomy
9. Endoscopic cystogastrostomy
10. Surgical cystenterostomy

## **MAJOR OUTCOMES CONSIDERED**

- Morbidity and mortality
- Cure rates and clinical success rates of procedures

## METHODOLOGY

### METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

### DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

#### Literature Search Procedure

The Medline literature search is based on keywords provided by the topic author. The two general classes of keywords are those related to the condition (e.g., ankle pain, fever) and those that describe the diagnostic or therapeutic intervention of interest (e.g., mammography, MRI).

The search terms and parameters are manipulated to produce the most relevant, current evidence to address the American College of Radiology Appropriateness Criteria (ACR AC) topic being reviewed or developed. Combining the clinical conditions and diagnostic modalities or therapeutic procedures narrows the search to be relevant to the topic. Exploding the term "diagnostic imaging" captures relevant results for diagnostic topics.

The following criteria/limits are used in the searches.

1. Articles that have abstracts available and are concerned with humans.
2. Restrict the search to the year prior to the last topic update or in some cases the author of the topic may specify which year range to use in the search. For new topics, the year range is restricted to the last 5 years unless the topic author provides other instructions.
3. May restrict the search to Adults only or Pediatrics only.
4. Articles consisting of only summaries or case reports are often excluded from final results.

The search strategy may be revised to improve the output as needed.

### NUMBER OF SOURCE DOCUMENTS

The total number of source documents identified as the result of the literature search is not known.

### METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

### RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

#### Strength of Evidence Key

Category 1 - The conclusions of the study are valid and strongly supported by study design, analysis, and results.

Category 2 - The conclusions of the study are likely valid, but study design does not permit certainty.

Category 3 - The conclusions of the study may be valid, but the evidence supporting the conclusions is inconclusive or equivocal.

Category 4 - The conclusions of the study may not be valid because the evidence may not be reliable given the study design or analysis.

## **METHODS USED TO ANALYZE THE EVIDENCE**

Systematic Review with Evidence Tables

### **DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE**

The topic author drafts or revises the narrative text summarizing the evidence found in the literature. American College of Radiology (ACR) staff draft an evidence table based on the analysis of the selected literature. These tables rate the strength of the evidence for all articles included in the narrative text.

The expert panel reviews the narrative text, evidence table, and the supporting literature for each of the topic-variant combinations and assigns an appropriateness rating for each procedure listed in the table. Each individual panel member forms his/her own opinion based on his/her interpretation of the available evidence.

More information about the evidence table development process can be found in the ACR Appropriateness Criteria® Evidence Table Development document (see "Availability of Companion Documents" field).

## **METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Expert Consensus (Delphi)

### **DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS**

#### **Modified Delphi Technique**

When the data available from existing scientific studies are insufficient, the American College of Radiology Appropriateness Criteria (ACR AC) employs systematic consensus techniques to determine appropriateness. The ACR AC panels use a modified Delphi technique to determine the rating for a specific procedure. A series of surveys are conducted to elicit each individual panelist's expert opinion of the appropriateness of an imaging or therapeutic procedure for a specific clinical scenario based on the available data. ACR staff distributes surveys to the panelists along with the evidence table and narrative. Each panelist interprets the available evidence and rates each procedure. Voting surveys are

completed by panelists without consulting other panelists. The ratings are integers on a scale between 1 and 9, where 1 means the panel member feels the procedure is "least appropriate" and 9 means the panel member feels the procedure is "most appropriate." Each panel member has one vote per round to assign a rating. The surveys are collected and de-identified and the results are tabulated and redistributed after each round. A maximum of three rounds are conducted. The modified Delphi technique enables each panelist to express individual interpretations of the evidence and his or her expert opinion without excessive bias from fellow panelists in a simple, standardized, and economical process.

Consensus among the panel members must be achieved to determine the final rating for each procedure. If eighty percent (80%) of the panel members agree on a single rating or one of two consecutive ratings, the final rating is determined by the rating that is closest to the median of all the ratings. Up to three voting rounds are conducted to achieve consensus.

If consensus is not reached through the modified Delphi technique, the panel is convened by conference call. The strengths and weaknesses of each imaging examination or procedure are discussed and a final rating is proposed. If the panelists on the call agree, the rating is accepted as the panel's consensus. The document is circulated to all the panelists to make the final determination. If consensus cannot be reached, "No consensus" appears in the rating column and the reasons for this decision are added to the comment sections.

## **RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS**

Not applicable

## **COST ANALYSIS**

A formal cost analysis was not performed and published cost analyses were not reviewed.

## **METHOD OF GUIDELINE VALIDATION**

Internal Peer Review

## **DESCRIPTION OF METHOD OF GUIDELINE VALIDATION**

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria.

# **RECOMMENDATIONS**

## **MAJOR RECOMMENDATIONS**

**ACR Appropriateness Criteria®**

**Clinical Condition: Percutaneous Catheter Drainage of Infected Fluid Collections**

**Variant 1: Young adult patient (20–40 years of age) presents with a 7-day history of right lower quadrant abdominal pain, fever, and leukocytosis. Physical examination shows no peritoneal signs. CT scan shows a thin-walled, 3 x 4 cm fluid collection adjacent to the cecum, nonvisualization of the appendix, and an appendicolith. Highly suspicious for appendicitis. Treatment includes antibiotics.**

<b>Treatment/Procedure</b>	<b>Rating</b>	<b>Comments</b>
PCD only	7	
PCD followed by delayed surgery	6	
Needle aspiration	4	If no response to antibiotics.
Conservative management only	3	
Immediate surgical drainage	2	
<b><u>Rating Scale:</u> 1=Least appropriate, 9=Most appropriate</b>		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

**Variant 2: Elderly patient (more than 70 years of age) with a history of left hemicolectomy 2 months ago for colon carcinoma presents with abdominal pain and fever 2 weeks after placement of a 12-French drain into a complex, 5 cm abdominal fluid collection. Catheter output is 25 cc per day, and the collection is unchanged in size by CT. No fistula. Complex, purulent collection. Next step.**

<b>Treatment/Procedure</b>	<b>Rating</b>	<b>Comments</b>
Catheter upsizing	7	Depends on viscosity of fluid.
Intracavitary thrombolytic therapy and drainage	6	Commonly used, but evidence is lacking.
Laparoscopic drainage	5	Second-line therapy clinical response to PCD is incomplete.
Open surgical drainage	5	Second-line therapy clinical response to PCD is incomplete.
Continued antibiotics	3	

Treatment/Procedure	Rating	Comments
and drainage		
Continued antibiotics and drain removal	1	
<b><u>Rating Scale:</u> 1=Least appropriate, 9=Most appropriate</b>		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

**Variant 3: Young adult patient (20–40 years of age) IV drug-abuser presents with fever and tachycardia and is found to have two noncommunicating splenic abscesses measuring 4 cm in diameter and accessible percutaneously through a 1 cm rim of normal splenic tissue. Appropriate management includes antibiotics.**

Treatment/Procedure	Rating	Comments
PCD only	7	Second-line therapy.
Splenectomy	6	If PCD fails or is complicated.
Needle aspiration	5	To aspirate and hone antibiotic therapy if surgical risk is too high.
Conservative management only	3	
<b><u>Rating Scale:</u> 1=Least appropriate, 9=Most appropriate</b>		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

**Variant 4: Middle-aged patient (40–60 years of age) presents with abdominal pain radiating to the back 5 weeks after hospitalization for acute pancreatitis. Patient is afebrile. CT scan shows a 5 cm walled-off collection in the body of the pancreas indenting a broad portion of the body of the stomach. The collection is percutaneously accessible with a 3 cm window. MRCP shows a patent pancreatic duct.**

Treatment/Procedure	Rating	Comments
Endoscopic cystogastrostomy	8	Depends on availability of skilled endoscopist.
PCD only	6	
Surgical cystenterostomy	5	
Conservative management	3	

Treatment/Procedure	Rating	Comments
only		
Percutaneous needle aspiration	3	As a diagnostic tool to demonstrate that the symptoms are related to the pseudocyst.
<b><u>Rating Scale: 1=Least appropriate, 9=Most appropriate</u></b>		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

**Variant 5: Middle-aged patient (40–60 years of age) presents with a 2-week history of cough, fever, and foul-smelling sputum. Worsening despite a full course of broad-spectrum antibiotics. Sputum cultures were negative. CT scan shows a 4 cm fluid collection in the lower lobe of the right lung.**

Treatment/Procedure	Rating	Comments
PCD only	7	
Surgery	4	If drainage fails.
Another course of antibiotics and postural drainage	3	
Needle aspiration	3	May help target antibiotic therapy but not as a primary therapy.
<b><u>Rating Scale: 1=Least appropriate, 9=Most appropriate</u></b>		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

**Variant 6: Young adult female patient (20–40 years of age) presents with abdominal pain, fever, and leukocytosis. Pelvic examination shows marked tenderness. CT scan shows a 4 cm walled-off probable tubo-ovarian abscess (TOA), safely accessible from the transgluteal, transvaginal, and transrectal approaches. Appropriate first-line treatment includes antibiotics.**

Treatment/Procedure	Rating	Comments
Transvaginal PCD	7	Transvaginal vs transgluteal determined on a case by case basis. Depends on expertise and patient preference.
Transgluteal PCD	7	Transvaginal vs transgluteal determined on a case by case basis. Depends on



<b>Treatment/Procedure</b>	<b>Rating</b>	<b>Comments</b>
		expertise and patient preference.
Transvaginal needle aspiration	6	Transvaginal vs transgluteal determined on a case by case basis. Depends on expertise and patient preference.
Transgluteal needle aspiration	6	Transvaginal vs transgluteal determined on a case by case basis. Depends on expertise and patient preference.
Conservative management only	5	TOAs may resolve with antibiotics but are often treated more aggressively in young patients to preserve fertility. Some will resolve with conservative management and antibiotics. Literature is unclear.
Surgical/laparoscopic drainage	4	When drainage routes or other techniques are difficult or have failed.
Transrectal needle aspiration	3	Could lead to superinfection. Only if other approaches are not reasonable.
Transrectal PCD	3	
<b><u>Rating Scale: 1=Least appropriate, 9=Most appropriate</u></b>		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

## **Summary of Literature Review**

### **Diagnosis and Treatment of Fluid Collections**

Detection and evaluation of fluid collections are typically accomplished with computed tomography (CT) and/or ultrasound (US) in patients who manifest signs and symptoms of possible infection or clinical impairment. Routine imaging of postoperative patients should be discouraged, as postoperative fluid collections are commonly present and may not be infected. Expense and availability limit magnetic resonance imaging (MRI) for this purpose. US is fast, avoids ionizing radiation, and provides more detailed evaluation of the internal structure and composition of complex collections. US is more limited in the evaluation of collections deep within the soft tissues or adjacent to loops of bowel than CT or MRI, and it fails to penetrate intracavitary, pulmonary, or enteric gas. Therefore, US is more commonly used to screen for superficial or large fluid collections and collections within or adjacent to solid organs. CT provides the advantage of detection of deep collections and the use of intravenous (IV) and oral contrast to distinguish collections from adjacent vasculature or bowel. CT is usually the first-line modality in patients with fever of unknown origin. Multidetector CT scanners with sagittal and coronal reformatting can help distinguish collections from adjacent structures.

The choice of imaging guidance for draining fluid collections varies with availability, operator expertise, body habitus, presence of adjacent structures, size and location of the collection, and presence of intracavitary or enteric gas. The choice of treatment options for a given collection may vary among operators and depends on size, location, and clinical presentation. Options include antibiotics coupled with supportive measures such as bowel rest and hyperalimentation, needle aspiration for drainage or to hone antibiotic coverage, percutaneous catheter drainage (PCD), PCD with sclerotherapy, PCD with thrombolytic therapy, endoscopic drainage, immediate surgery, or delayed surgery.

Two basic techniques are available for PCD: Seldinger and trocar. For percutaneous aspiration and drainage, success thresholds of 95% and 85% have been recommended. Choice of technique is primarily operator dependent, though the trocar technique has been advocated for endocavitary drain placement to avoid the risk of loss of access during the process of serial dilation — a complication associated with the Seldinger technique.

### **Fluid Collections in the Abdomen**

Abdominal abscesses are most often the result of diverticulitis, appendicitis, Crohn's disease, and recent laparotomy. When possible, open surgical drainage (OSD) is avoided due to a high rate of morbidity and mortality. For the management of small (<3 cm) collections, most authors advocate a trial of antibiotics alone with consideration given to needle aspiration to hone antibiotic coverage for persistent cases. This approach uses follow-up imaging and repeat aspiration if the collection does not resolve. PCD is advocated for larger collections. Peritoneal signs, active hemorrhage, and lack of maturation of the abscess wall have been suggested as contraindications to PCD. The highest success rates have been achieved for abscesses resulting from recent laparotomy, and as a result, PCD with antibiotics is usually the only required treatment for this entity.

For mature abscesses associated with Crohn's disease, an initial combination of PCD, antibiotics, high-dose steroids, bowel rest, and (on occasion) hyperalimentation has been advocated to reduce the failure rate of PCD, temper the acute infection, and allow for surgical resection under more sterile, elective conditions. Some patients (33%–50%) will ultimately require surgical drainage or resection, but most authors still advocate a first-line trial of PCD if technically possible.

For mature abscesses associated with appendicitis, an initial combination of PCD, antibiotics, bowel rest, and (on occasion) hyperalimentation has been advocated for the same reason. Some disagreement exists in the literature regarding the need for subsequent ("interval") appendectomy after successful PCD. In a study of 1,012 patients with appendicitis, investigators evaluated the need for PCD and the subsequent need for interval appendectomy after successful PCD. On initial presentation, the vast majority of patients with appendicitis required emergent surgery. If nonoperative management was successful, 80% of patients were cured without surgery.

### **Fluid Collections in the Pelvis**

Depending on location, pelvic fluid collections can be drained via the transabdominal, transgluteal, transrectal, transvaginal, and transperineal routes, and the efficacy and safety of these routes have been established by a number of retrospective reports. The choice of route for a given abscess varies among operators and institution type, with transrectal and transvaginal approaches used much more commonly in academic centers. In general, reports have advocated the use of the most sterile route possible when aspirating or draining a potentially sterile collection. Using this rationale, the transabdominal and transgluteal routes would be preferable to the endocavitary routes for a potentially sterile collection. The transperineal route is most commonly used in patients after low anterior resection for rectal cancer. Some disagreement exists in the literature regarding the level and incidence of significant or persistent pain when comparing the transgluteal and endocavitary routes. At a minimum, conscious sedation is required for these procedures. The route of transgluteal drainage through the greater sciatic foramen should be medial to the sciatic nerves and below the level of the piriformis muscle to prevent the complications of persistent pain or injury to the gluteal arteries.

For tubo-ovarian abscesses, some disagreement exists in the literature regarding the appropriate treatment. Many resolve with antibiotics and supportive care, but more recently, early aspiration (for simple collections) and transvaginal drainage (for complex collections) have been advocated to prevent prolongation of the disease and the potential associated loss of fertility.

For prostatic abscesses, the longstanding treatment method has been transurethral drainage, but recent small studies have demonstrated that guidance of needle aspiration or placement of small-bore pigtail catheters using transrectal US can shorten hospital stay and provide a viable alternative.

### **Fluid Collections of the Solid Organs**

Hepatic abscesses may be treated differently depending on their size and etiology. Pyogenic abscesses most often result from portal venous seeding of diverticulitis and appendicitis, but they also may occur from obstruction of the biliary system, including the gallbladder. For pyogenic abscesses under 3 cm in diameter, authors have advocated using antibiotics, either alone or in conjunction with needle aspiration, with excellent success rates. For pyogenic abscesses over 4 to 5 cm in diameter, PCD is often required. Amebic abscesses have been shown to respond extremely well to antibiotics without intervention, regardless of size, but occasionally they require needle aspiration.

Splenic abscesses were considered to be surgical cases as recently as the 1990s, but a number of small, retrospective series have readdressed this issue, some advocating the benefits of PCD for solitary, simple collections and splenectomy for multiple collections. Preservation of splenic function is maintained by the use of PCD techniques, and this should be attempted where possible and safe. Current data are relatively sparse, and some disagreement exists.

A significant amount of confusing terminology is used when discussing pancreatitis, including acute and subacute fluid collections. It is urged that operators adhere to standards such as the Atlanta criteria when describing such collections. Pancreatic pseudocysts may resolve spontaneously if they are small,

stable, and sterile. Drainage is generally advocated for large (5 cm or greater), rapidly enlarging, painful, obstructing, or infected pseudocysts. Techniques for drainage are multidisciplinary, and continued disagreement on the optimal use of these techniques leads to a variety of treatment algorithms for these patients. Treatment options include endoscopic drainage with or without creation of a cystenterostomy, surgical drainage with or without creation of a cystenterostomy, and PCD. PCD generally requires a prolonged period of drainage in these patients compared to abscesses in other locations, but high rates of eventual success have been reported. Complete occlusion of the main pancreatic duct central to the pseudocyst may lead to failure of PCD and necessitate use of surgical or endoscopic marsupialization to bowel.

Pancreatic abscesses are associated with a high rate of mortality and are drained emergently. For suboptimal surgical candidates, minimally invasive alternatives include endoscopic drainage or PCD. PCD is typically used as a temporizing measure prior to surgery since cure rates range from 14% to 32%. High rates of clinical success have been reported using endoscopic techniques, which may be optimal for more central collections and those abutting the greater curvature of the stomach. Large, complex collections involving the tail of the pancreas or not in direct communication with the pancreas may be better treated by PCD.

Renal abscesses may be cured by medical treatment in over half of cases, even up to 64%, and both renal and perirenal abscesses may otherwise require PCD, surgical drainage, or nephrectomy.

### **Fluid Collections in the Chest**

Most pyogenic intrapulmonary abscesses resolve with appropriate antibiotic coverage, usually determined by culture of sputum or blood and, less optimally, by culture of cavitory fluid obtained by needle aspiration or bronchoscopy. PCD and surgical resection/drainage are generally reserved for cases that persist or worsen despite antibiotics. Empyemas are typically drained by PCD if they are focal or uniloculated, and by surgical chest tube placement if they are multiple, multiloculated, complex, and extensive. Persistent, complex collections and organizing hemothoraces have been successfully treated with instillation of fibrinolytic agents. Communication to the bronchial tree in the form of a bronchopleural fistula may require prolonged catheter drainage with the catheter placed to suction water seal.

Persistent, large, malignant, and benign pleural effusions have been successfully treated or managed with pleurodesis through small-bore catheters or permanent drainage catheters with one-way valves to prevent pneumothorax. Mediastinal abscesses are most commonly the result of thoracic surgical procedures, and most commonly require PCD.

### **Fluid Collections Refractory to Percutaneous Catheter Drainage**

Persistence of fluid collections despite PCD may be the result of factors such as complex loculations and septations; fistulization of the cavity to the enteric, biliary, genitourinary, pancreatic, or bronchial systems; the presence of neoplastic tissue; and communication of the cavity to the lymphatic system. Depending on the reason for incomplete drainage, options may include catheter manipulation,

catheter upsizing, diversion of upstream obstructions, or surgical drainage — both open and laparoscopic. Fibrinolysis of complex, multiseptated fluid collections refractory to PCD by intracavitary instillation of fibrinolytic agents such as tissue plasminogen activator has been reported. Available reports are limited in number and often small, but high rates of clinical success have been demonstrated retrospectively for abdominal and pelvic abscesses as well as organizing hemothorax and empyema. Rates of bleeding complications using intracavitary recombinant tissue plasminogen activator (r-tPA) have been low to zero for pelvic, abdominal, and chest collections, except for a 33% rate of pleural hemorrhage noted for intrapleural r-tPA for patients on anticoagulation. For persistent sterile collections such as cysts, lymphoceles, and seromas, a number of reports describe high rates of success in shortening the period of catheterization by intracavitary instillation of sclerotherapy agents such as ethanol or tetradecyl sulfate. For cases of fistulization of the abscess cavity to enteric, biliary, genitourinary, pancreatic, or bronchial systems, PCD may be successful with prolonged catheterization.

PCD of an infected or fluid-filled tumor may be inadvertent or intentional. For good surgical candidates, tumor resection is typically performed. For poor surgical candidates, the period of catheterization may be markedly prolonged or indefinite. Despite this finding, patients with infected, inoperable tumors at risk for systemic infection may opt for PCD.

On occasion, PCD fails to resolve the associated fluid collection despite these measures. In such circumstances, the benefit of PCD may be to limit the hematogenous or local spread of infection and improve the acute clinical presentation, thereby preparing the patient for a more elective, single-step surgical procedure. This treatment algorithm has been described for appendicitis and Crohn's disease.

## **Summary**

- CT and US are the most common modalities used to diagnose and guide PCD of fluid collections. US provides more detailed evaluation of complex collections and excellent evaluation of the solid organs, but is more limited in the evaluation of collections deep within the soft tissues, adjacent to loops of bowel, or behind or containing gas. CT provides better detection of deep collections, distinction from adjacent vasculature or bowel, and more complete evaluation of patients with fever of unknown origin.
- Abdominal abscesses are typically drained with PCD if they are large (>4–5 cm), mature, and not associated with peritonitis or active hemorrhage. Imaging immediately after drainage will allow determination if additional catheters are necessary, as all collections should be preferably drained at the initial setting unless lack of a safe pathway precludes such an approach.
- Pelvic collections may be drained using multiple routes of access, including transabdominal, transgluteal, transperineal, and endocavitary. Sterile routes are more appropriate for potentially sterile collections.
- Collections may be refractory to PCD in cases of fistula formation, complex internal structure, the presence of neoplastic tissue, or communication to the lymphatic system. Depending on the cause, treatment options include prolonged catheterization, catheter manipulation or upsizing, diversion of upstream obstruction, bowel rest, instillation of fibrinolytic agents, instillation of sclerotherapy agents, and surgical drainage.

- PCD has been applied to splenic and pancreatic abscesses with variable results and recommendations in the literature, suggesting that the best current approach is multidisciplinary, depending on the extent and location of disease.
- Smaller abscesses and abscesses of the kidney and lung parenchyma have a high rate of clinical response to antibiotic therapy and supportive care, with more invasive treatments typically reserved for extensive or refractory cases.

### **Abbreviations**

- CT, computed tomography
- IV, intravenous
- MRCP, magnetic resonance cholangiopancreatography
- PCD, percutaneous catheter drainage
- TOAs, tubo-ovarian abscesses

### **CLINICAL ALGORITHM(S)**

Algorithms were not developed from criteria guidelines.

## **EVIDENCE SUPPORTING THE RECOMMENDATIONS**

### **TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS**

The recommendations are based on analysis of the current literature and expert panel consensus.

## **BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS**

### **POTENTIAL BENEFITS**

Appropriate use of percutaneous catheter drainage (PCD) and other interventions for the treatment and management of infected fluid collections

### **POTENTIAL HARMS**

- *Open surgical drainage* carries a high rate of morbidity and mortality.
- Risk of loss of access during the process of serial dilation is a complication of the Seldinger technique of *percutaneous catheter drainage (PCD)*.
- Rates of bleeding complications using intracavitary recombinant tissue plasminogen activator (r-tPA) have been low to zero for pelvic, abdominal, and chest collections, except for a 33% rate of pleural hemorrhage noted for intrapleural r-tPA for patients on anticoagulation.

## **CONTRAINDICATIONS**

### **CONTRAINDICATIONS**

Peritoneal signs, active hemorrhage, and lack of maturation of the abscess wall have been suggested as contraindications to percutaneous catheter drainage (PCD).

## QUALIFYING STATEMENTS

### QUALIFYING STATEMENTS

The American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those exams generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

### IMPLEMENTATION TOOLS

Personal Digital Assistant (PDA) Downloads

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better

### IOM DOMAIN

Effectiveness

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

Lorenz JM, Funaki BS, Ray CE Jr, Brown DB, Gemery JM, Greene FL, Kinney TB, Kostelic JK, Millward SF, Nemcek AA Jr, Owens CA, Reinhart RD, Rockey DC, Silberzweig JE, Vatakencherry G, Expert Panel on Interventional Radiology. ACR Appropriateness Criteria® percutaneous catheter drainage of infected fluid collections. [online publication]. Reston (VA): American College of Radiology (ACR); 2009. 8 p. [51 references]

### ADAPTATION

Not applicable: The guideline was not adapted from another source.

### DATE RELEASED

2009

### GUIDELINE DEVELOPER(S)

American College of Radiology - Medical Specialty Society

### SOURCE(S) OF FUNDING

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria®.

### GUIDELINE COMMITTEE

Committee on Appropriateness Criteria, Expert Panel on Interventional Radiology

### COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

*Panel Members:* Jonathan M. Lorenz, MD (*Principal Author*); Brian S. Funaki, MD (*Panel Chair*); Charles E. Ray, Jr, MD (*Panel Vice-Chair*); Daniel B. Brown, MD; John M. Gemery, MD; Frederick L. Greene, MD; Thomas B. Kinney, MD; Jon K. Kostelic, MD; Steven F. Millward, MD; Albert A. Nemcek, Jr, MD; Charles A. Owens, MD; Robert D. Reinhart, MD; Don C. Rockey, MD; James E. Silberzweig, MD; George Vatakencherry, MD

### FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

### GUIDELINE STATUS

This is the current release of the guideline.



The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

## **GUIDELINE AVAILABILITY**

Electronic copies: Available in Portable Document Format (PDF) from the [American College of Radiology \(ACR\) Web site](#).

ACR Appropriateness Criteria® *Anytime, Anywhere*™ (PDA application). Available from the [ACR Web site](#).

Print copies: Available from the American College of Radiology, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

## **AVAILABILITY OF COMPANION DOCUMENTS**

The following are available:

- ACR Appropriateness Criteria® overview. Reston (VA): American College of Radiology; 2 p. Electronic copies: Available in Portable Document Format (PDF) from the [American College of Radiology \(ACR\) Web site](#).
- ACR Appropriateness Criteria® literature search process. Reston (VA): American College of Radiology; 1 p. Electronic copies: Available in PDF from the [ACR Web site](#).
- ACR Appropriateness Criteria® evidence table development. Reston (VA): American College of Radiology; 4 p. Electronic copies: Available in PDF from the [ACR Web site](#).

## **PATIENT RESOURCES**

None available

## **NGC STATUS**

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